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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/098,593	03/18/2002	Shinichi Kojima	ASA-1075	7649

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Mattingly, Stanger & Malur, P.C
104 East Hume Avenue
Alexandria, VA 22301

EXAMINER

SONG, HOON K

ART UNIT	PAPER NUMBER
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2882

DATE MAILED: 10/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/098,593

Applicant(s)

KOJIMA ET AL.

Examiner

Hoon Song

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-46 is/are pending in the application.
- 4a) Of the above claim(s) 28-46 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-27, drawn to an X-ray and gamma ray imaging system, classified in class 378, subclass 4.
- II. Claims 28-46, drawn to an plain CT X-ray gantry design, classified in class 378, subclass 15.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as X-ray and PET combination imaging system. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with John Mattingly on September 25, 2003 a provisional election was made without traverse to prosecute the invention of I, claims 1-27. Affirmation of this election must be made by applicant in replying to this Office action. Claims 28-46 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one

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or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Specification

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 4, 6-13, 20-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Nutt et al. (US 6449331B1).

Regarding claims 1 and 6 Nutt teaches a radiological imaging apparatus comprising:

an X-ray source (22) apparatus that radiates X-rays; and

a plurality of radiation detectors (24) that output both a first detection signal which is a detection signal of said X-rays that have passed through a test subject and a

second detection signal which is a detection signal of gamma-rays radiated from said test subject (column 6 line 8+).

Regarding claims 2 and 8 Nutt teaches that a tomographic image data creation apparatus that creates first tomographic image data of said test subject based on said first detection signal, creates second tomographic image data of said test subject based on said second detection signal and creates fused tomographic image data combining said first tomographic image data and said second tomographic image data (column 6 line 8+).

Regarding claims 4 and 9, Nutt teaches that said radiation detector is a scintillator (column 7 line 23+).

Regarding claim 7, Nutt teaches that a plurality of signal discriminators connected to said respective radiation detectors, which separate said first detection signal and said second detection signal from said output signal entered (column 7 line 13+ and column 6 line 17+).

Regarding claims 10, Nutt teaches a radiological imaging apparatus comprising:

an X-ray source (22) apparatus that radiates X-rays;

a plurality of first radiation detectors (24a) that output an output signal including a first detection signal which is a detection signal of said X-rays that have passed through a test subject and a second detection signal which is a detection signal of gamma-rays radiated from said test subject (column 5 line 50+);

a plurality of second radiation detectors (24b) that output an output signal including a first detection signal which is a detection signal of said X-rays and a second detection signal which is the detection signal of gamma-rays (column 5 line 50+);

a signal processor that calculates an intensity of said first detection signal based on the output signal of said first radiation detector (column 6 line 51+);

a signal discriminator that separates said second detection signal from the output signal of said second radiation detector (column 6 line 17+) ; and

a counter that calculates a count rate for the second detection signal separated by said signal discriminator (column 7 line 4+).

Regarding claim 11, Nutt teaches a tomographic image data creation apparatus that creates first tomographic image data of said test subject based on the intensity of said first detection signal, creates second tomographic image data of said test subject based on the count rate of said second detection signal and creates fused tomographic image data combining said first tomographic image data and said second tomographic image data (column 6 line 8+).

Regarding claims 12, Nutt teaches that a test subject holding apparatus provided with a bed which is movable in a longitudinal direction to carry a test subject; and an image pickup apparatus, wherein said image pickup apparatus comprises (figure 1 and 2):

a radiation detector ring structure that surrounds an area in which said bed is inserted and includes a plurality of radiation detectors;

an X-ray source that irradiates said test subject with X-rays; and

an X-ray source transfer apparatus (column 6 line 2+) that transfers said X-ray source in the circumferential direction of said radiation detector ring structure, and said respective radiation detectors output both a first detection signal which is the detection signal of said X-rays that have passed through said test subject and a second detection signal which is the detection signal of gamma-rays radiated from said test subject (column 5 line 50+).

Regarding claim 13, Nutt teaches a tomographic image data creation apparatus that creates first tomographic image data of said test subject based on the intensity of said first detection signal, creates second tomographic image data of said test subject based on the count rate of said second detection signal and creates fused tomographic image data combining said first tomographic image data and said second

tomographic image data (column 6 line 8+).

Regarding claim 20, Nutt teaches that said radiation detector is a scintillator (abstract).

Regarding claim 21, Nutt teaches a radiological imaging apparatus comprising:
a test subject holding apparatus provided with a bed (10) which is movable in a longitudinal direction to carry a test subject (16); and

an image pickup apparatus (figure 1), wherein said image pickup apparatus comprises:

a radiation detector ring structure that surrounds an area in which said bed is inserted and includes a plurality of radiation detectors (figure 1 and 2);

an X-ray source (22) that irradiates said test subject with X-rays; and

an X-ray source transfer apparatus (column 6 line 2+) that transfers said X-ray source in the circumferential direction of said radiation detector ring structure, and said respective radiation detectors output an output signal including a first detection signal which is the detection signal of said X-rays that have passed through said test subject and a second detection signal which is the detection signal of gamma-rays radiated from said test subject (column 5 line 38+).

Regarding claim 22, Nutt teaches that a signal discriminator which separates said first detection signal and said second detection signal from said output signal entered and which is connected to each of said plurality of radiation detectors (column 7 line 14+).

Regarding claim 23, Nutt teaches that said signal discriminator that separates said first detection signal and said second detection signal based on energy of said output signal (column 7 line 14+, and column 6 line 17+).

Regarding claim 24, Nutt teaches that a tomographic image data creation apparatus that creates first tomographic image data of said test subject based on said first detection signal, creates second tomographic image data of said test subject based on said second detection signal and creates fused tomographic image data combining said first tomographic image data and said second tomographic image data (column 6 line 8+).

Regarding claim 27, Nutt teaches that said radiation detector is either a semiconductor radiation detector or scintillator (column 7 line 22+).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 3 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nutt in view of Boutenko et al. (US 6332014B1).

Regarding claims 3, 14 and 17, Nutt fails to teach that a controller pulsing x-ray source for a set time.

Boutenko teaches pulsing x-ray source in predetermined time (column 1 line 15+).

It would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt Boutenko's x-ray pulsing to produce pulsed x-ray beam for

reducing patient exposure rate. Thus one would be motivated to control the exposure time to prevent adverse effect of the x-ray over dosage for patients.

Regarding claims 15, Nutt teaches that for each of said radiation detectors:

a first signal processor that processes said first detection signal (column 6 line 8+);

a second signal processor that processes said second detection signal (column 6 line 8+);

a signal processor provided with a switching apparatus that transmits said first detection signal from said radiation detectors to said first signal processor and transmits said second detection signal from said radiation detectors to said second signal processor (column 7 line 14+); and

a switching control apparatus that controls said switching apparatus so that said first detection signal output from said radiation detector selected according to the position of said X-ray source transfer apparatus in the circumferential direction of said radiation detector ring structure is transmitted to said first signal processor (column 6 line 8+).

Regarding claim 16, Nutt teaches a tomographic image data creation apparatus that creates first tomographic image data of said test subject based on the intensity of said first detection signal, creates second tomographic image data of said test subject based on the count rate of said second detection signal and creates fused tomographic image data combining said first tomographic image data and said second tomographic image data (column 6 line 8+).

Claims 5, 18-19 and 25-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nutt as in view of Ohnesorge et al. (US 5666391).

Regarding claims 5, 18-19 and 25-26, Nutt as modified by Townsend fails to teach that an image pickup apparatus is provided with a collimator.

Ohnesorge teaches the collimator (abstract).

In view of Ohnesorge, it would have been obvious to an artisan of ordinary skill in the art at the time the invention was made to adopt the collimator in order to provide partial shielding against the obliquely incident scattered radiation (column 1 line 23+). Accordingly one would be motivated to adopt the collimator because it would provide better x-ray image by reducing scattered radiation (column 1 line 17+).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Townsend et al. (US 6490476B1) teaches a PET/CT system.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoon Song whose telephone number is 703-308-2736. The examiner can normally be reached on 8:30 AM - 5 PM, Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 703-308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.



DAVID V. BRUCE
PRIMARY EXAMINER

Hoon Song . HK S